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Memo

To: Anthony Brown - Atlantic Richfield Company
From: Marc Lombardi, Principal Geologist
Greg Lambeth, Engineering Geologist

Project: 0013091150

Date: May 12, 2017

Subject: Crusher Road Slope Instability – Observation Update

INTRODUCTION

This memorandum presents an update of the observations relating to instability of the Crusher Road Slope.

CONDITION SUMMARY

On Thursday, April 27, 2017, ground cracks were observed in the slope east of Pond 4, herein referred to as the Crusher Road slope. The Crusher Road slope is approximately 50 to 60 feet in height, with overall slope angles between 1.8:1 to 2.1:1 (Horizontal:Vertical). The Crusher Road lies at the top of the slope and the California access road lies at the toe of the slope. The toe of the Crusher Road slope lies approximately 30 to 50 feet east of, and across the California access road from Pond 4. Ground cracking was noted in two distinct areas of the Crusher Road slope; a roughly linear network of ground cracks was observed along the top of the Crusher Road slope/western edge of the Crusher Road, and an arcuate scarp was also noted in the bottom half of the Crusher Road Slope, across from the south end of Pond 4.

On initial inspection on April 27, 2017, the ground crack at the top of the Crusher Road slope (Labelled "A" on Figure 1) was observed to be approximately 200 feet long, and up to 1 to 3 inches wide with 1 to 2 inches of vertical offset (slope side of the ground crack down dropped relative to the Crusher Road side of the crack). The crack was restricted to the berm area along the crest of Crusher Road slope. Visual observations over the last two weeks indicate this feature has been creeping since initial discovery. On May 12, 2017, 15 days after discovery, this ground crack had increased in length and had more pronounced aperture and vertical offset. The north and south ends of the ground crack at the Crusher Road slope crest were observed to extend approximately 30 feet down slope and 40 feet down the slope, respectively. The ground crack along the slope crest was up to 5 inches wide with up to approximately 12 inches of vertical offset. Additional ground cracks approximately ½ to 1 - inch wide were also encountered up to half way across the Crusher Road.

On initial inspection on April 27, 2017, the approximately 80-foot-long arcuate scarp in the bottom half of the Crusher Road slope (labelled "B" on Figure 1) was observed to have up to 6-inches of vertical offset. The south end of scarp extended to the toe of slope, while the north

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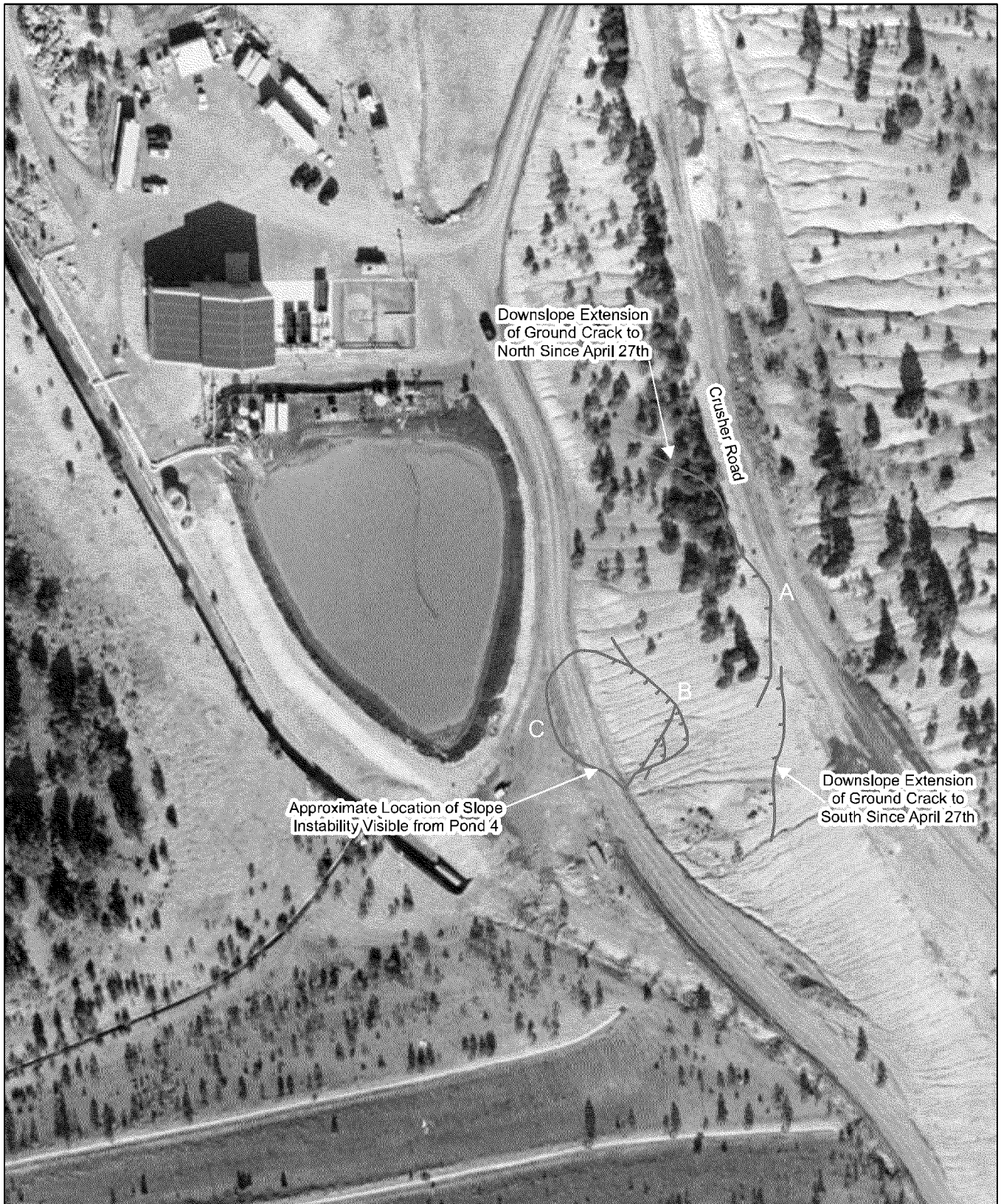
end of the scarp terminated on the slope approximately 15 feet up from the toe. Active seepage was noted at the toe of slope, and evidence of previous seepage was observed in several spots on the slope at the northern terminus of the scarp, approximately 15 feet up from the toe of the slope. Visual observations over the last two weeks indicate this feature has been creeping since initial discovery. On May 12, 2017, approximately 15 days after discovery, the scarp had increased in height to approximately 5 feet, and the northern end of the scarp had extended down to the toe of the slope. A visible bulge in the California access road with up to 4 feet of vertical rise was noted, including a well-defined toe (labelled "C" on Figure 1) riding out over the existing roadway with 6 inches to 1 foot of vertical offset. Continued seepage was noted along the toe of the slope.

Amec Foster Wheeler is preparing a surface movement monitoring program intended to support the assessment of surface conditions with regards to potential hazards to site personnel associated with the Crusher Road Slope Instability. The proposed monitoring will generally consist of observations, measurements, and photographic documentation of ground deformation features, water seepage, surface water flow, surface water ponding, scarp height and width, groundwater levels, and the physical condition of Pond 4. Atlantic Richfield will review its plans with the Water Board before for installing any measuring devices or other equipment on or near the Crusher Road slope.

Attachments:

Figure 1 Crusher Road Slope Instability
Appendix A Crusher Road Slope Instability Photographs

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Explanation:

— Instability Features

0 50 100
Feet



CRUSHER ROAD SLOPE
INSTABILITY
Leviathan Mine Site
Alpine County, California

By: DPV

Date: 05/12/2017

Project No. 13091



Figure
1

APPENDIX A **CRUSHER ROAD SLOPE INSTABILITY PHOTOGRAPHS** Leviathan Mine Site Alpine County, California



Photograph 1 April 27, 2017. Southern end of ground cracking at top of Crusher Road Slope. View looking southwest

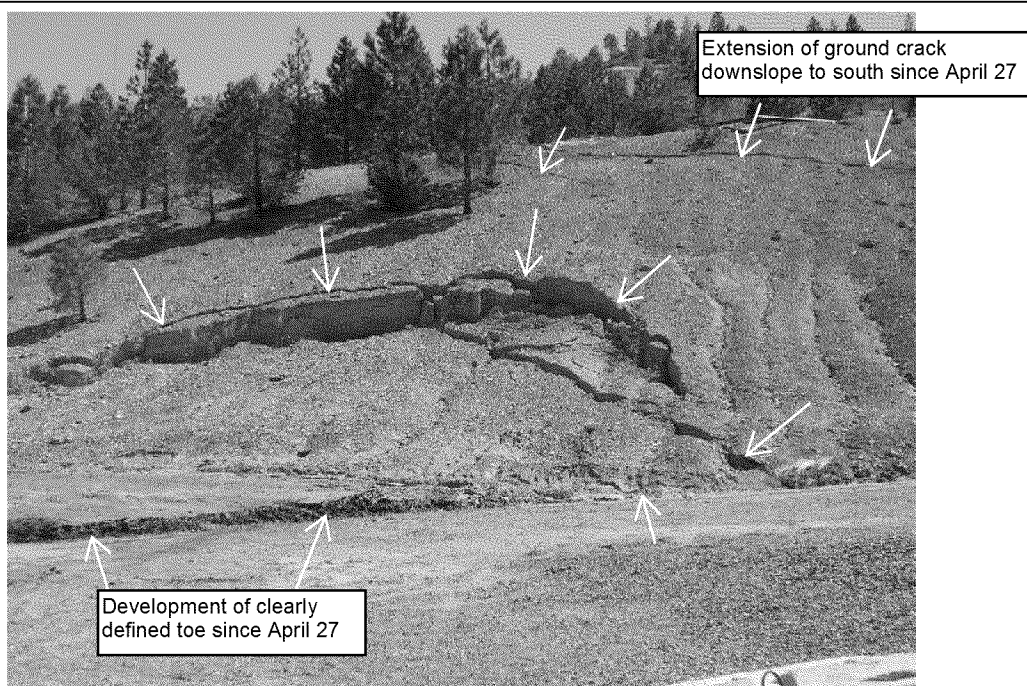


Photograph 2 May 11, 2017. Southern end of ground cracking at top of Crusher Road Slope. View looking southwest

APPENDIX A **CRUSHER ROAD SLOPE INSTABILITY PHOTOGRAPHS** Leviathan Mine Site Alpine County, California



Photograph 3 April 28, 2017 Instability in lower half of Crusher Road slope. View looking northeast



Photograph 4 May 11, 2017 Instability in lower half of Crusher Road slope. View looking northeast